

# 2011

# ROBO

## World's Biggest Robot Event

by Lem Fugitt, [www.robots-dreams.com](http://www.robots-dreams.com)

**R**oboGames 2011 was held at the San Mateo Event Center, midway between downtown San Francisco and San Jose, right in the heart of the high tech geek heaven called Silicon Valley. Over the three day run the event drew over 20,000 paid attendees and featured close to 600 robots from 239 teams that had flown in from 17 different countries. There were 59 major competition categories including robot soccer, hockey, sumo, micro-mouse, kung-fu, Mech Warfare, art bots, and of course the combat robot battles that the event has become known for world-wide.

Major contingents participated from Mexico, Japan, Brazil, Korea, the UK, Canada, Indonesia, Colombia, and a host of other countries. As you might expect, the largest number of medals won (86) went to the USA since it was the host country and presented the least difficulty in terms of travel, expense, and time commitment. Mexico came in second place with 16 medal wins. After several years of minimal participation, Japan came back in force at RoboGames 2011 snagging 10 gold and 5 bronze medals putting them solidly in third place.

### WHAT MAKES ROBOGAMES DIFFERENT?

RoboGames, like all great things, started from a simple, almost casual, personal observation that has been nurtured with passion and unflinching commitment by the event organizers, competitors, and fans over the past eight years enabling it to become the worlds largest, and unquestionably most exciting, robot competition in the world.

Unlike other major competitive robot initiatives, RoboGames doesn't focus on a particular aspect of robotics or a specific robot classification. From the very beginning the organizers set out to attract a wide range of robot builders from every possible discipline and to create an environment that would actively encourage as much interaction and cross-pollination as possible. Although

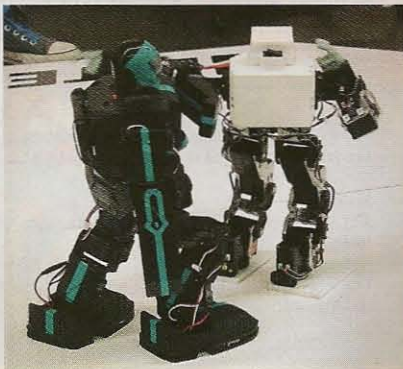


having fun is always the primary objective for everyone at RoboGames, competitors and fans alike, a close second is to exchange ideas, inspiration, and learning. All the participants come away full of new ideas, concepts, and "what if I..." insights. And, they are so motivated that they come back year after year, usually with friends and associates in tow ready to engage and experience this fantastic event first hand.

### WHAT IF...?

Back around 2002, David Calkins was teaching robotics in the San Francisco Bay area and kept trying to arouse interest by staging different robot centric events at public venues, like the Exploratorium. He was struck by the fact that robot developers tended to specialize with a very narrow focus.

Robot sumo builders are excellent at autonomous designs to find their competitor in the ring, but tend to be weak at durable mechanical design. Battle bot robot developers excel at building robots that can withstand severe impacts at high speed and keep performing. But, they are usually weak in other areas, like sensors, autonomous operation or software development. The advanced computer science stu-



# GAMES

dents would be fantastic at developing AI software but would be totally helpless when their robot faced even the most minor hardware failure.

What if he could gather all the different robot disciplines together to compete? Would they be purists and reject builders from other specialties, or was there a chance that they would hit it off, inspire each other, and that magic would happen? It seemed like a high risk proposition, especially since there was almost zero funding available and everything would have to be organized using volunteers. David has never shrunk from a challenge, no matter how formidable it might appear, so he put everything on the line and went for it—full speed ahead.



PHOTOS BY LEM FLUGIT

## LET THE GAMES BEGIN!

The first RoboGames event was in 2004 and was called the RoboOlympics at that time. Participants came from 19 countries with robots competing in 40 different events. The response from competitors, fans, the media, and the public, was so positive that there was no turning back. Over the years, the event has faced many challenges, financial difficulties, and conflicts. Nevertheless, David and his wife, Simone Davalos, have never wavered for an instant in their total commitment, even when David broke his foot assembling the audience grandstands and had to walk around using crutches for months.

## ROBOTS BECOME SPORTS HEROS

As a part of the event, many RoboGames competitors have robot trading cards made and actively swap them. Just like major league baseball player trading cards, the robot trading cards feature a posed photo of the robot on the front while the back of the card lists its stats, the builders, and features its country's flag.

## UNINTENDED CONSEQUENCES

The RoboGames organizers never specifically set out to become the world's largest robot competition, or to get scholarships for partici-



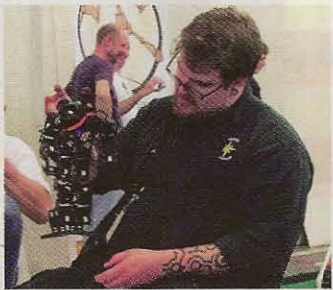
Brazil and has given them tremendous visibility and honor back home.

Instead, those things happened naturally as a result of the tremendous interest and enthusiasm generated by the event. Quite a few student participants from overseas have received scholarships from organizations in their home countries after winning RoboGames medals. Annual RoboGames participation has even become a key part of the education calendar for university teams like RioBotz from

## BIG NOISE, BIG SPARKS, BIG CRASHES, BIG EXCITEMENT

The biggest draw, noisiest, and most exciting competition at RoboGames is always the combat robots. Fans and competitors alike look forward to the event as the high point of the year. Some of them travel clear across the globe from locations as far away as Brazil and Eastern Europe just to be a part of this incredible sport.

There are nine different classifications, typically determined by the robot's weight, ranging from tiny robot warriors under 150 grams all the way up to the battling bruisers that tip the scales at 220 pounds. Most of the robots are operated by remote control, in much the same fashion as R/C planes or cars. In fact, some of the control systems have been borrowed from those hobbies and adapted to suit the needs of heavy duty combat. These robots aren't cheap, especially as the robot gets larger. Some of the heaviest robots cost more than



a new car to design, build, and maintain in fighting condition.

You might expect that the number of entries would drop in an economic downturn. But exactly the opposite has occurred. For RoboGames 2011 there were a total of 186 combat robots entered, with some of the classes far exceeding the preset number of entries set by the organizers. The 220 lbs weight class, which has to be the most challenging, and most expensive robot classification, had 28 entries alone.

The battles take place in a custom designed cage with steel floors, I-beam barriers around the perimeter, special hydraulically operated gates to allow the robots and competitors access to the combat area, and 1 inch thick clear walls to provide a good view for the audience while protecting them from flying shrapnel, flames, and other debris.

The cage was deliberately designed to keep all the harmful elements contained while letting all of the excitement, energy, noise, and adrenaline escape to wash over the



crowd like a breaking wave. And, it serves its purpose perfectly. When powerful robots like Sewer Snake and Last Rites crash the noise fills the entire building and brings people running to see what happened.

**A YEAR'S WORK LIVES OR DIES IN 3 MINUTES**

Matches last only 3 minutes. If a robot can totally disable or immobilize its competitor, it automatically wins by a technical knock-out. That happens more often than you might imagine, but more often the winner is decided by a group of expert judges who award points based on a system that puts a lot of weight on aggressiveness. It is called "combat" for a reason. Teams use every possible strategy and trick to gain some advantage, though there are 160 distinct rules governing the competition. Some massive robots jam their opponents into the cage barriers like a pile driver to the point that the referee has to call time and stop the competition while the robot is pried loose by several people with huge crowbars.



Each team has their own unique philosophy and approach to the competition. Team Tiki from Laney College and lead by Micah "Chewy" Liebowitz focuses on entertainment as much as competitiveness. Of course they play to win, but their first priority is to create a work of art that will amuse and delight the audience. This year their Mini-Fridge robot incorporated tank treads, a huge pneumatic hammer to pound competitors, and a quarter inch thick steel wedge, all of which provided tons of excitement, cheers and laughter, and it also managed to make it into the finals on the last day.

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**BRAZILIAN TEAM SETS A SHINING EXAMPLE**

The RioBotz team from Brazil and led by Professor Marco Meggiolaro, focuses on coupling inspiration with education. The amount of energy, time, and effort they put into designing and competing with combat robots is a shining example for others and pays off, not only with the audience in California but more importantly with their community back home in Brazil where they have motivated hundreds, if not thousands, of students and educators to get involved in robotics and engineering as a career choice.

The top RioBotz combat robot, Touro Maximus is a drum spinner design. The robots 70 pound drum spins at speeds up to 8,000



rpm rotating upwards so that it can throw even the heaviest opponent flying into the air as if it were a balloon. Touro Maximus, piloted by Daniel, the RioBotz team driver, demonstrated unbelievable power and performance when it faced off against Team Moon's Vera, a bar spinner robot that looks like a massive lawnmower capable of ripping through the toughest and thickest steel. Touro Maximus managed to break Vera's tempered steel blade twice during the match, and finished off the competition by throwing Vera up in the air and behind the I-beam barrier wall.

Michael "Fuzzy" and Debbie Mauldin of Team Toad from Austin, Texas competed with Avalanche, a rammer design equipped with eight large tires to keep it moving and protect its sides. Team Hardcore made it into the finals with Great Pumpkin, a wedge design using electric wheelchair motors.

Team ScotBots, comprised of high school students wearing kilts, designed "Ragin' Scotsman" a killer wedge robot packing a flame thrower. The team's lead driver, Forrest, is only 16 years old, but has been hooked on combat robotics since seeing his first competition during his elementary school days.

### SEWER SNAKE BRINGS HOME THE GOLD, AGAIN

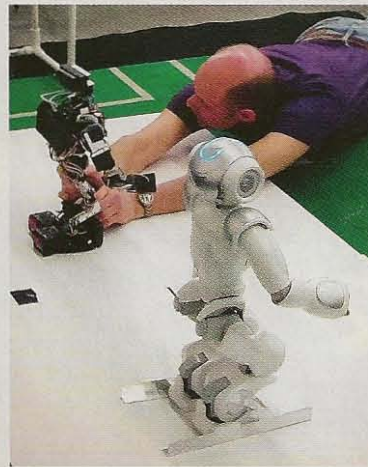
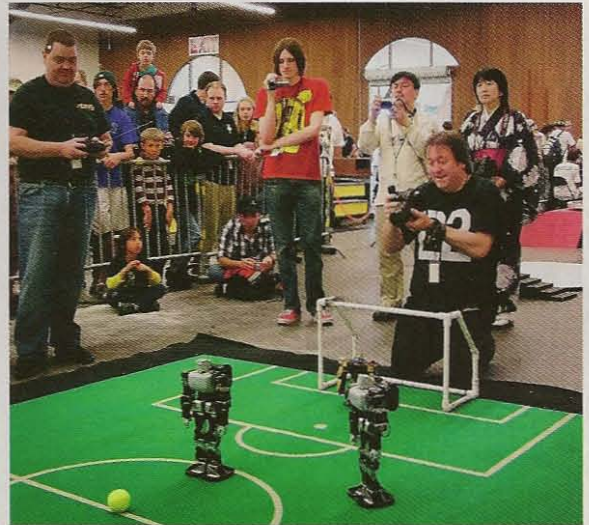
The Grand Champion for the combat robot competition at RoboGames 2011 was Sewer Snake from Team Plumb Crazy - Matt and Wendy Maxham - bringing home its fourth gold medal. Maxham designed Sewer Snake as 80% drive and 20% weapon believing that as long as his robot could still move it stood a chance of winning. That being said, Sewer Snake's chassis, powertrain, and built-in flame thrower are about as close to 100% weapon as you can get.

The competition was non-stop and incredibly intense. Perhaps it had something to do with the fact that everything was being captured for posterity by the Science Channel's video crew producing the "Killer Robots" program to be broadcast on Memorial Day. That may have been a small factor, but we prefer to believe that the competition would have been just as strong and exciting even if Grant Imahara and all the cameras hadn't been on the scene.

### MECH WARFARE RULES!

The most exciting new development on the robot scene has to be Mech Warfare. Two years ago a small group of robot enthusiasts lead by Andrew Alter set out to "create a real-life robotic combat competition that mirrors the scenarios found in Sci-Fi universes such as Battletech, Warhammer 40k and Armored Core." The concept was so innovative and exciting that they were able to recruit support from leading experts like Fon Davis, the award winning model and miniatures artist who made major creative contributions to many of the Star Wars movies and other well known science fiction epics.

Mech Warfare is extremely challenging. The robots, which can be humanoid or multi-legged, are equipped with Airsoft weapons and scoring systems. The matches take place in a 1/24th scale city complete in every detail. The operators are not allowed to view the battlefield directly and have to depend totally on cameras mounted on their robots - just as it would be in real life combat situations. There is even an extreme classification where the robots can use micro rockets and CO2 projectile weapons.



Participation in Mech Warfare has grown exponentially. The first year there were very few competitors and lots of technical problems. By 2010 more builders were ready to take the field and battle it out. This year the turnout was way beyond anything the organizers had ever dreamed of, with 28 entries plus two multi-legged robots from Japan that were operated remotely by their designers back home in Tokyo.

### SPEAKER SYMPOSIUM

RoboGames isn't just robots trying to bash each other into extinction. There is also a strong academic and even intellectual side to the event. The RoboGames 2011 Speaker Symposium, chaired by Heather Knight (Marilyn Monrobot/Carnegie Mellon University) and Marek Michalowski (Beatbots), featured top level presentations on the use of medical robots and the future of surgery, robot musicality and cyborg performance, cloud enabled robots, the promise and perils of open robotics, and many others from leading robot developers and researchers.

### HOW WILL THEY TOP THIS?

RoboGames 2011 was definitely a milestone in the history of the competition as well as for robot competitions in general. It's hard to imagine how they will manage to make it even better and more exciting for RoboGames 2012. Don't worry. They are already mapping out new competitions and ways to improve the existing events. Humanoids, Mech Warfare, Robot Sumo, and other events will definitely see a lot of expanded participation next year. We're really looking forward to seeing you at RoboGames 2012. ©

Links  
 Robots Dreams, [www.robots-dreams.com](http://www.robots-dreams.com)  
 Mech Warfare, <http://mech-warfare.com>  
 RoboGames, [www.robogames.net](http://www.robogames.net)

For more information, please see our source guide on page 89.